

Cosmin Radoi

CEO, Unhack AI

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Experience

- 2017-today **Unhack AI** (Iuvo AI, Inc.), CA, USA
Founder. Working on making automated program transformation mainstream. Principal Investigator for NSF SBIR Award #1747219 aimed at developing and bringing to market tools that improve code quality and help avoid dangerous bugs .
- 2016-2017 **University of Illinois at Urbana-Champaign**, IL, USA
IBM Ph.D. Fellowship. Worked on automatically inferring general program transformation rules from examples.
- summer 2016 **University of Illinois at Urbana-Champaign**, IL, USA
Entrepreneurial Lead. Participated in I-Corps, an NSF-funded market discovery program. The aim of the program is to help transition research from academia to industry via startups.
- 2010 – 2016 (except below) **University of Illinois at Urbana-Champaign**, IL, USA
Research Assistant. Worked on automated program analysis and transformation. Developed a very precise static race detector for Java. Explored ways to introduce parallelism to Javascript. Developed a new approach to automatically parallelize Java code via rewriting.
- summer 2015 **Samsung Research America**, CA, USA
Research Intern. Worked with Manu Sridharan, Satish Chandra, and Colin Gordon on program transformation inference.
- spring 2014 **University of Illinois at Urbana-Champaign**, IL, USA
fall 2011 Teaching Assistant. Designed and graded homework, supervised student class projects, and held office hours for the SE courses.
- summer 2013 **IBM Research - T.J. Watson**, NY, USA
Research Summer Intern. Worked with Stephen Fink, Manu Sridharan, and Rodric Rabbah on developing a automatic transformation from sequential imperative code to MapReduce-style functional code. Our work was published in OOPSLA '14.
- April, May 2012 **Boeing**, WA, USA (**University of Illinois at Urbana-Champaign**, IL, USA)
August 2011 Teaching Assistant. Assisted my advisor with three one-week, intensive courses on parallel programming for Boeing developers. Designed exercises and assisted with labs. Taught the one-day lecture on using program analysis tools for improving speedup and thread safety.
- July 2012 **UPCRC and I2PC Summer Schools on Multicore Programming**
July 2011 Teaching Assistant. Designed exercises and helped students solve them. Taught a lecture on program analysis tools.

- summer 2009 **University of Illinois at Urbana-Champaign**, IL, USA
 Research Intern. Supervised by Danny Dig and advised by Ralph Johnson. We created ReLooper, a refactoring tool for parallelizing Java loops.
- 2006 – 2008 **Primaevus, Ltd.**, Timișoara, Romania
 Founder and Software Developer. Worked on developing several web applications including a large custom e-commerce solution in Ruby on Rails.
- 2005 – 2007 **Synnet, Ltd.**, Birmingham, U.K.
 Independent contractor. Among others, developed websites for the Birmingham City Council and an application for tracking mobile phone shipments by wholesalers.

Education

- 2018 **University of Illinois at Urbana-Champaign**
 Ph.D. in Computer Science
 Thesis: *Toward Automatic Programming*
 Advisor: Grigore Rosu
- 2013 **University of Illinois at Urbana-Champaign**
 M.S. in Computer Science
 Thesis: *Practical Static Race Detection for Java Parallel Loops*
 Advisor: Danny Dig
(received the David J. Kuck Outstanding M.S. Thesis Award)
- 2010 **Polytechnic University of Timișoara**
 Bachelor of Engineering in Computer and Software Engineering
 Thesis: *A Data-Flow Analysis for Finding Race Conditions in Parallelised Loops*
 Advisor: Marius Minea

Peer-Reviewed Papers

- HICSS 50 **Are Web Applications Ready for Parallelism?**
 Cosmin Radoi, Stephan Herhut, Jaswanth Sreeram, Danny Dig
(received the IBM-ISSIP Best Paper Award)
- TOSEM'15 **Effective Techniques for Static Race Detection in Java**
 Cosmin Radoi, Danny Dig
- ICSE'15 **CARAMEL: Detecting and Fixing Performance Problems That Have Non-Intrusive Fixes**
 Adrian Nistor, Po-Chun Chang, Cosmin Radoi, Shan Lu
(received the ACM SIGSOFT Distinguished Paper Award)
- PPoPP'15 **Are web applications ready for parallelism?**
 poster Cosmin Radoi, Stephan Herhut, Jaswanth Sreeram, Danny Dig
- OOPSLA'14 **Translating Imperative Code to MapReduce**
 Cosmin Radoi, Steven Fink, Rodric Rabbah, Manu Sridharan
- FSE'14 **Retrofitting Concurrency for Android Applications through Refactoring**
 Yu Lin, Cosmin Radoi, and Danny Dig
<http://mir.cs.illinois.edu/~yulin2/asynchronizer>

- ISSTA'13 **Practical Static Race Detection for Java Parallel Loops**
Cosmin Radoi, Danny Dig
(received the ACM SIGSOFT Distinguished Paper Award)
<http://github.com/cos/IteRace>
- OOPSLA'09 **Relooper: Refactoring for Loop Parallelism in Java**
demo Danny Dig, Mihai Tarce, Cosmin Radoi, Marius Minea, Ralph Johnson

Patents

- Patent # **Automatic Conversion of Sequential Array-Based Programs
to Parallel Map-Reduce Programs**
20160110176
2016 Stephen Fink, Rodric Rabbah, Cosmin-Aurel Radoi, Manu Sridharan

Technical Reports

- 2012 **Inclusion-based Pointer Analysis Using Actors**
Cosmin Radoi, Semih Okur
- 2012 **Hadoop+Aparapi: Making Heterogenous MapReduce Programming Easier**
Semih Okur, Cosmin Radoi, Yu Lin
- 2012 **Loop2GPU: Transforming Loops to OpenCL Kernels as a LLVM Pass**
Semih Okur, Cosmin Radoi
- 2009 **ReLooper: Refactoring for Loop Parallelism**
Danny Dig, Cosmin Radoi, Mihai Tarce, Marius Minea, Ralph Johnson
<http://hdl.handle.net/2142/14536>

Presentations

- August 2015 **Learning Program Transformations from Examples**
poster, Samsung Research America, Mountain View, CA
- June 2015 **WALAFacade, Facade for Using WALA from Scala**
talk, Workshop on WALA, Portland, OR
- October 2014 **Translating Imperative Code to MapReduce**
talk and poster, OOPSLA, Portland, OR
- August 2014 **Translating Sequential Code to Map-Reduce**
visit talk, Twitter, San Francisco, CA
- July 2013 **Practical Static Race Detection for Java Parallel Loops**
talk, ISSTA, Lugano, Switzerland
- May 2011 **Fast and Precise Static Race Detection for Data-Parallel Java Programs**
UPCRC talk, University of Illinois, Urbana, IL
- April 2011 **Static Race Detection for Data-Parallel Programs**
GradExpo poster, University of Illinois, Urbana, IL

Software

- Unhack AI** CEO. Unhack is a new GitHub app that analyzes a repo and suggests code fixes and improvements. Each suggestion is not just a description, but an actual code diff.
<https://unhack.ai>
- K** Core developer. K is a rewriting-based framework for specifying executable semantics, defining type systems, and doing verification and program transformation.
<https://github.com/kframework/k>
- IteRace** Static race detector for Java parallel loops. It reduces false positives while not sacrificing safety. Similar tools typically report an unmanageable number of warnings. IteRace does better by specializing the static analysis to Java constructs and libraries.
<https://github.com/cos/IteRace>
- WALAFacade** A facade for making WALA (T.J. Watson Libraries for Analysis) easier to use from Scala. It allows bypassing boilerplate code required because of Java's less flexible type system.
<https://github.com/cos/WALAFacade>
- Relooper** An Eclipse-based code refactoring tool for introducing parallelism to Java programs. The tool is a team effort and I have contributed mainly to the static analysis module that checks thread-safety using a static data-flow analysis.
<http://refactoring.info/tools/ReLooper>
- Robotelu'** A flexible, lightweight web crawler framework. Written in Ruby, open source.
<https://github.com/cos/robotelu>
- DxfLibrary** An AutoCAD Drawing Interchange Format library. Written in C#, open source.
<https://github.com/cos/dxflibrary>
- ImeiMate** A shipment-tracking application for UK mobile phone wholesalers. I have developed it as outsource for Synnet, Ltd. It is a .NET application written in C#, closed source.

Service

- Journal Reviewing TPDS '16, JSS '16, TPDS '17, JSS '19
- Committee Member External Review Committee, PLDI '16
Artifact Evaluation Committee, OOPSLA '16, ECOOP '15
- Reviewer FM '16, OOPSLA '13, CAV '15, GPCE '14, ECOOP '13, OOPSLA '12, CSMR '12,
FSE '12, ASE '11, PPOPP '11
- Mentor ITI Summer Undergraduate Research Internship Program '11 and '12
(after) – Caius Brandescu (Ph.D. student at Oregon State University)
– Loránd Szakács (Ph.D. student at Iowa State University)
– Alex Gyori (Ph.D. student at University of Illinois)
- Individual Study
– Anda Bereckzy (Engineer at Microsoft)

Awards

- 2018 PI for Iuvo AI NSF SBIR Award #1747219: Programmer-Friendly Automatic Code Fixes
- 2017 IBM-ISSIP Best Paper Award for the HICSS 50 work on JavaScript parallelism
- 2016 IBM Ph.D. Fellowship
Feng Chen Memorial Award in Software Engineering
- 2015 David J. Kuck Outstanding M.S. Thesis Award
ACM SIGSOFT Distinguished Paper Award for the ICSE'15 work on performance fixes
- 2013 ACM SIGSOFT Distinguished Paper Award for the work on IteRace published in ISSTA '13
- 2002 First prize at the "Noi Info" software projects competition
- 2000 First place at the Romanian National Olympiad in Informatics